

REMARKS

Favorable reconsideration of this application in light of the following discussion, is respectfully requested.

Claims 1-20 are pending in this application.

In the outstanding Office Action, Claims 1-2 and 11-12 were rejected under 35 U.S.C. §103(a) as unpatentable over Orito (U.S. Patent No. 6,072,912) in view of Yamamoto et al. (U.S. Patent No. 4,841,376, hereinafter "Yamamoto") and Nosaki (U.S. Patent No. 5,099,341); Claims 3-4 and 13-14 were rejected under 35 U.S.C. §103(a) as unpatentable over Orito in view of Yamamoto, Nosaki and Barron et al. (U.S. Patent No. 5,659,355, hereinafter "Barron"); Claims 5-8 and 15-18 were rejected under 35 U.S.C. §103(a) as unpatentable over Orito in view of Yamamoto, Nosaki and Arimoto (U.S. Patent No. 5,371,613); and Claims 9-10 and 19-20 were rejected under 35 U.S.C. §103(a) as unpatentable over Orito in view of Yamamoto, Nosaki and Shigeeda (U.S. Patent No. 5,900,948).

Applicants acknowledge with appreciation the courtesy of Examiner Thompson in granting an interview in this case with Applicants' representatives on September 18, 2007, during which time the issues in the outstanding Office Action were discussed as substantially summarized hereinafter and also on the Interview Summary Sheet. No agreement was reached during the interview pending a formal response to the outstanding Office Action.

In response to the rejection of Claims 1, 2, 11, and 12 under 35 U.S.C. § 103(a), Applicants respectfully request reconsideration of the rejection and traverse the rejection as discussed below.

Independent Claim 1 is directed to an image reading device including, *inter alia*:

a photoelectric device including a plurality of pixels and
provided with an empty transfer part, the empty transfer part

outputting an empty transfer level corresponding to black dummy pixels which are always shaded and are not used for reading an image;

...

a reference voltage varying part varying a reference voltage of said A-D converter to vary between first, second, and third reference voltages based on a current mode of an image scanner, the first reference voltage selected for a background removal function, and one of the second and third reference voltages being selected when the background removal function is not used;

...

a correcting part correcting the black correction reference data by a ratio between a first digital black level value obtained from an output voltage level of said empty transfer part obtained through said A-D converter when the black correction reference data is detected and a second digital black level value obtained from an output voltage level of said empty transfer part obtained through said A-D converter when the image is read.

As acknowledged at page 4 of the outstanding Office Action, Orito in view of Yamamoto does not disclose “a correcting part correcting the black correction reference data by a ratio between a first digital black level value obtained from an output voltage level of said empty transfer part obtained through said A-D converter when the black correction reference data is detected and a second digital black level value obtained from an output voltage level of said empty transfer part obtained through said A-D converter when the image is read,” as recited in Applicants’ independent Claim 1. In an attempt to cure this deficiency, the Office Action cites Nosaki.

However, Nosaki fails to cure any of the above-noted deficiencies of Orito and Yamamoto. Page 5 of the outstanding Office Action asserts that column 7, lines 41-47 of Nosaki describes Applicants’ claimed “correcting part.” Page 5 further states “it would have been obvious to a person of ordinary skill in the art at the time of the invention to specifically use a ratio as the relation between two digital level values, wherein the second one is taken from data obtained during an image read operation as taught by Nosaki, wherein the two

digital level values are the first digital black level and the second digital black level taught by Orito.” Applicants respectfully traverse this position.

Nosaki describes that a white shading memory 660l for subscanning stores a signal (white shading value for subscanning) obtained by performing, by divider 660k, main scan white shading correction of a signal read from a shading correction plate 22. The signal read from the shading correction plate 22 is read first in all the lines upon read scanning.¹ Thus, Nosaki describes *white shading correction*, not *correcting black correction reference data by a ratio* between a first digital black level obtained from an output voltage level of an empty transfer part and a second digital black level value obtained from an output voltage level of the empty transfer part obtained through the A-D converter when the image is read. In addition, in Nosaki, there is no first digital black level *obtained from an output voltage level of the empty transfer part obtained through an A-D converter when the black correction reference data is detected*, and there is no second digital black level *obtained from an output voltage level of the empty transfer part obtained through an A-D converter when an image is read*.

Further, in Nosaki, the divider 660k divides an output from subtractor 660j, i.e. a black shading corrected signal, with the white shading value for main scanning from white shading memory 660h for main scanning. Nosaki also describes that the divider 660k then divides the quotient with *the white shading value* for subscanning, *from white shading memory 660l* for subscanning, thus *outputting the quotient as image data*. Thus, in Nosaki, the quotient is output as image data, whereas in Applicants’ Claim 1, the ratio of the first digital black level to the second digital black level is used to correct the black correction reference data.

¹ See Nosaki at column 7, lines 41-47.

The cited references also fail to teach or suggest “a reference voltage varying part varying a reference voltage of said A-D converter to vary between *first, second, and third reference voltages based on a current* mode of an image scanner, the *first reference voltage selected for a background removal function*, and *one of the second and third reference voltages being selected when the background removal function is not used*,” as in Applicants’ independent Claim 1.

Page 3 of the outstanding Office Action cites column 5, lines 52-62 of Orito as describing Applicants’ “reference voltage varying part.” However, this portion merely states “[w]hen the white plate 51 is irradiated with light, the image sensor 54 will produce one line’s worth of white level data consisting of 1648 pieces of white level data consisting of white level or white tone data. When the white plate 51 is irradiated with no light, the image sensor 54 will produce one line’s worth of black level data consisting of 1648 pieces of black level or black tone data.” However, Orito does not describe *varying a reference voltage* of an *A/D converter* between a first reference voltage, a second reference voltage, and a third reference voltage. Orito merely describes different ways in which the white plate is irradiated with light and the varying degrees of shading. Orito does not describe varying between three distinct reference voltages. Further, the white level data consisting of 1648 pieces of white level data, the black level data consisting of 1648 pieces of black level, and the tone data value GD(n) described in Orito are the image data itself and are not compared to another signal. Thus, the above values are not “reference” voltages of the A/D converter.

Also, Orito does not describe how the three reference voltages are varied based on a current mode of the scanner. Orito fails to describe different current modes at all. Orito also fails to teach or suggest that a first reference voltage is selected for a background removal function and one of the second or third reference levels is selected when the background removal function is not used. Page 3 of the outstanding Office Action cites column 9, lines

39-45 of Orito for a background removal function of the first reference voltage. However, Orito does not describe a background removal but rather *a tone correction procedure* that averages black levels.² Further, the tone data value GD(n) described at column 9, lines 39-34 of Orito *are different values* than the white level data (asserted to be equivalent to Applicants' three reference voltages³) described at column 5, lines 52-55 of Orito and thus these values are not equivalent to Applicants' "first reference voltage selected for a background removal function." The tone data values in Orito are also not a reference voltage of an A/D converter. Further, neither column 5, column 9, nor any other portion of Orito describes that a first reference voltage is selected for a background removal function and one of the second or third reference voltages being selected when the background removal function is not used.

The cited references also fail to teach or suggest "an empty transfer part, the empty transfer part outputting an empty transfer level corresponding to black dummy pixels which are always shaded and are not used for reading an image," as recited in Applicants' independent Claim 1. Applicants' specification describes, in a non-limiting example, that a digital black level value D0_t1 is obtained from A-D converting an empty transfer level voltage Vt1, which is an analog output of an empty transfer part ETP (black dummy pixels always shaded and not used for reading an image, corresponding to, for example, the top sensor 12, shown in FIG. 2) of the sensors 12 while the reference voltage Vref for the 8-bit A-D converters 14 is Vref0.⁴

As acknowledged at page 4 of the outstanding Office Action, neither Orito nor Yamamoto teaches or suggest that "the empty transfer part outputting an empty transfer level corresponds to black dummy pixels which are always shaded." In an attempt to cure this

² See Orito at column 8, lines 48-50.

³ See page 3 of the outstanding Office Action.

⁴ See the specification at page 21, line 20 to page 22, line 4.

deficiency, the Office Action cites the Nosaki reference. Page 5 of the outstanding Office Action cites column 3, lines 60-68 and column 7, lines 41-47 of Nosaki as describing Applicants' claimed "empty transfer part."

However, Nosaki does not describe an empty transfer level corresponding to black dummy pixels which are always shaded. Nosaki describes a first white reference plate 21 and a second white reference plate 22. In Nosaki, a white shading value for main scanning is read when an optical carriage 15 is moved to a position opposing shading correction plate 21 for main scanning while illumination lamp 13 is turned on by a CPU 60.⁵ As the first white reference plate 21 and the second white reference plate 22 are *read* in, black dummy pixels *are not always shaded*. Rather, the pixels are only shaded when illuminated by the illumination lamp 13. Further, Nosaki describes *white* shading correction and does not describe *black* dummy pixels. Orito does not describe black dummy pixels either. Orito describes a white plate 51, and does not describe that "a specific constant intensity value is black" as asserted at page 5 of the outstanding Office Action.

Accordingly, Applicants respectfully submit that independent Claims 1 and 2 (and all claims depending thereon) are patentable.

Independent Claims 11 and 12 recite "photoelectric means including a plurality of pixels and provided with an empty transfer part, the empty transfer part outputting an empty transfer level corresponding to black dummy pixels which are always shaded," "reference voltage varying means for varying a reference voltage of said A-D converting means to vary between first, second, and third reference voltages based on a current mode of an image scanner, the first reference voltage selected for a background removal function, and one of the second and third reference voltages being selected when the background removal function is not used," and "correcting means for correcting the black correction reference data by a

⁵ See Nosaki at column 7, lines 18-53.

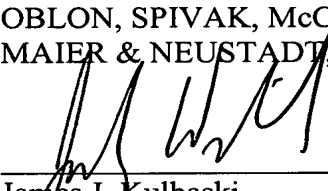
ratio a first digital black level value obtained from of an output voltage level of said empty transfer part obtained through said A-D converting means when the black correction reference data is detected and a second digital black level value obtained from an output voltage level of said empty transfer part obtained through said A-D converting means when the image is read," and are believed to be patentable for at least the reasons discussed above.

As none of the cited references, individually or in combination, teach or suggest the above-mentioned features as defined in independent Claims 1, 2, 11, and 12, Applicants respectfully submit that Claims 1, 2, 11, and 12 (and all claims depending thereon) are patentable over the asserted references for at least the reasons stated above.

Consequently, in view of the present amendment, and in light of the above discussion, the pending claims as presented herewith are believed to be in condition for formal allowance, and an early and favorable action to that effect is respectfully requested.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,
MAIER & NEUSTADT, P.C.



James J. Kulbaski
Attorney of Record
Registration No. 34,648
Joseph Wrkich
Registration No. 53,796

Customer Number
22850

Tel: (703) 413-3000
Fax: (703) 413 -2220
(OSMMN 06/04)

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